Complete Summary

GUIDELINE TITLE

Evidence-based clinical care guideline for acute gastroenteritis (AGE) in children aged 2 months through 5 years.

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence-based clinical care guideline for acute gastroenteritis (AGE) in children aged 2 months through 5 years. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2006 May. 15 p. [50 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for children with acute gastroenteritis (AGE). Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2001 Apr. 13 p.

The guideline was reviewed for currency in May 2006, using updated literature searches and was determined to be current.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Acute gastroenteritis

GUIDELINE CATEGORY

Evaluation
Management

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Dietitians
Nurses
Patients
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To help practitioners at all levels of experience refine their knowledge and select among the options for evaluation and management of children with acute gastroenteritis based on the most current and best scientific information

In the target population, the objectives of this guideline are to:

- Improve the use of appropriate clinical and laboratory assessment
- Increase the use of oral rehydration and early progression to usual diet
- Improve parental involvement in decision making around the management of acute gastroenteritis (AGE)
- Improve prevention of transmission of acute gastroenteritis
- Decrease use of emergency department (ED) services for management of mild cases
- Reduce the number of hospitalizations
- Reduce the length of stay

TARGET POPULATION

Children aged 2 months to 5 years of age with signs and symptoms of acute gastroenteritis (diarrhea of recent onset not caused by chronic disease) with or without accompanying nausea, vomiting, fever, or abdominal pain.

These guidelines do NOT address all considerations needed to manage those with the following:

- Toxic appearance or requiring intensive care
- Episodes of diarrhea lasting longer than 7 days
- Previously diagnosed disorders including immunodeficiency or those affecting major organ systems

- Vomiting with no accompanying diarrhea
- Acute gastroenteritis accompanying failure to thrive
- Diarrhea and/or vomiting accompanied by chronic metabolic disorders (e.g., diabetes, phenylketonuria [PKU])
- Diagnosis of hyponatremic or hypernatremic dehydration

INTERVENTIONS AND PRACTICES CONSIDERED

Evaluation

1. History and physical examination
2. Assessment of degree of dehydration
3. Laboratory studies (not routinely recommended)

Management

1. Usual diet
2. Small frequent feedings
3. Oral rehydration therapy solutions (ORS)
4. Intravenous (IV) therapy
5. Nasogastric oral rehydration solutions
6. Prompt refeeding of regular diet after rehydration
7. Antimicrobial therapy for selected children
8. Probiotics as adjunctive therapy
9. Hospitalization
10. Reassessment of hydration status
11. Patient/parent education

Note: Anti-diarrheal agents and anti-emetics are considered but not recommended.

MAJOR OUTCOMES CONSIDERED

- The severity of dehydration
- The need for intravenous or nasogastric (NG) therapies
- Hospitalization rate
- The duration of illness and length of hospitalization

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

To select evidence for critical appraisal by the group for the update of this guideline, the Medline, EmBase, and the Cochrane databases were searched for dates of January 2000 to March 2003 to generate an unrefined, "combined evidence" database using a search strategy focused on answering clinical questions relevant to acute gastroenteritis (AGE) and employing a combination of Boolean searching on human-indexed thesaurus terms (Medical Subject Heading

[MeSH} headings using an OVID Medline interface) and "natural language" searching on searching on human-indexed thesaurus terms (MeSH headings using an OVID Medline interface) and "natural language" searching on words in the title, abstract, and indexing terms. The citations were reduced by eliminating duplicates, review articles, non-English articles, and adult articles. The resulting abstracts were reviewed by a methodologist to eliminate low quality and irrelevant citations. During the course of the guideline development, additional clinical questions were generated and subjected to the search process, and some relevant review articles were identified. December 1999 was the last date for which literature was reviewed for the previous version of this guideline. The details of that review strategy are not documented. However, all previous citations were reviewed for appropriateness to this revision.

May 2006 Review

A search using the above criteria was conducted for dates of January, 2004 through May, 2006. Thirty-three relevant articles were selected as potential future citations for the guideline. However, none of these references were determined to require changes to the 2005 version of the recommendations.

NUMBER OF SOURCE DOCUMENTS

99

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Recommendations have been formulated by a consensus process directed by best evidence, patient and family preference and clinical expertise. During formulation of these guidelines, the committee members have remained cognizant of controversies and disagreements over the management of these patients. They have tried to resolve controversial issues where possible and, when not possible, to offer optional approaches to care in the form of information that includes best supporting evidence of efficacy for alternative choices.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Experience with the implementation of earlier publications of this guideline has provided learnings that have been incorporated into this revision. The guidelines have been reviewed and approved by clinical experts not involved in the development process, senior management, Risk Management & Corporate Compliance, other appropriate hospital committees, and other individuals as appropriate to their intended purposes.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Each recommendation is followed by evidence classification (A-X) identifying the type of supporting evidence. Definitions for the types of evidence are presented at the end of the "Major Recommendations" field.

Assessment and Diagnosis

Clinical Assessment

1. It is recommended that the history and physical examination be the primary basis for the diagnosis of acute gastroenteritis (AGE). See Figure and Appendix 1 in the original guideline document (Local Expert Consensus, 2005 [E]).
2. It is recommended that clinical assessment be initially performed for the presence and degree of dehydration (Steiner, DeWalt, & Byerley, 2004 [M]). See Appendix 2 in the original guideline document for physical parameters

associated with degree of dehydration. See Table 2 and Table 3 in the original guideline document for likelihood ratios of clinical signs.

Note 1: Prolonged capillary refill time, abnormal skin turgor, and absent tears are the best individual examination measures (Steiner, DeWalt, & Byerley, 2004 [M]) (see Table 2, Table 3, and Appendix 2 in the original guideline document).

Note 2: Clinical diagnosis of dehydration has been shown to be imprecise and thus a general classification of a child's dehydration status such as none, some (mild/moderate), or severe is suggested by the literature as a useful starting point in the management of the child at risk for dehydration (Steiner, DeWalt, & Byerley, 2004 [M]; King et al., 2003 [S, E]).

Note 3: Acute body weight change is considered the gold standard measure of dehydration in a child but is often impractical for the initial assessment due to lack of an accurate pre-illness weight measurement (Gorelick, Shaw, & Murphy, 1997 [C]; Duggan et al., 1996 [C]).

Laboratory Studies

3. It is recommended that laboratory tests not be routinely performed in children with signs and symptoms of AGE, including tests for specific pathogens, such as those for rotavirus, ova and parasites, bacteria, and fecal antigen tests for parasites (Northrup & Flanigan, 1994 [S]; Local Expert Consensus, 2005 [E]).

   Note: Serum electrolytes are sometimes useful in assessing children with moderate to severe dehydration and who require intravenous (IV) or nasogastric (NG) fluids. A normal bicarbonate concentration may be useful in ruling out dehydration (Steiner, DeWalt & Byerley, 2004 [M]).

Management Recommendations

Prevention of Dehydration

4. It is recommended that continued use of the child's preferred, usual, and age appropriate diet be encouraged to prevent or limit dehydration (Brown, Peerson, & Fontaine, 1994 [M]; Fayad et al., 1993 [A]; Alarcon et al., 1992 [A]). Regular diets are generally more effective than restricted and progressive diets, and in numerous trials have consistently produced a reduction in the duration of diarrhea (Alarcon et al., 1991 [A]; Margolis et al., 1990 [B]; Placzek & Walker-Smith, 1984 [B]; Khin et al., 1985 [C]).

   Note 1: The historical BRAT diet (consisting of bananas, rice, applesauce, and toast) is unnecessarily restrictive, but may be offered as part of the child's usual diet (King et al., 2003 [S,E]).

   Note 2: Clear liquids are not recommended as a substitute for oral rehydration solutions (ORS) or regular diets in the prevention or therapy of

dehydration (King et al., 2003 [S,E]) (See Appendix 4 in the original guideline document).

Note 3: The vast majority of patients with AGE do not develop clinically important lactose intolerance. In selected patients with documented, persistent lactose intolerance, lactose-free formulas are recommended (Brown, Peerson, & Fontaine, 1994 [M]).

Note 4: A meta-analysis of 16 studies found no significant clinical advantage to diluting milk or formula in the management of AGE (Brown, Peerson, & Fontaine, 1994 [M]).

5. It is recommended that the vomiting child be offered frequent small feedings (every 10 to 60 minutes) of any tolerated foods or ORS (Wan et al., 1999 [A]; Santosham et al., 1985 [A]).
6. It is recommended that a child with recurrent vomiting but no signs of significant dehydration may be managed by frequent telephone follow up or by direct supervision in the office, emergency department, or in a hospital setting (see Appendix 1 in the original guideline document for triage suggestions) (Local Expert Consensus, 2005 [E]).

Rehydration

7. It is recommended that dehydration be treated with ORS, if tolerated and if intake exceeds losses, for a period of 4 to 6 hours or until an adequate degree of rehydration is achieved (Gavin, Merrick, & Davidson, 1996 [M]; Gore, Fontaine, & Pierce, 1992 [M]; Cohen et al., 1995 [A]; Molina et al., 1995 [A]; Fayad et al., 1993 [A]; Santosham et al., 1985 [A]; Santosham et al., 1982 [A]; Atherly-John, Cunningham, & Crain, 2002 [B]; Nager & Wang, 2002 [B]; Listernick, Zieserl, & Davis, 1986 [B]; Tamer et al., 1985 [C]; King et al., 2003 [S,E]; Holliday, 1996 [S,E]).
8. It is recommended
    - when unable to replace the estimated fluid deficit and keep up with the on-going losses using oral feedings alone, and/or
    - for severely dehydrated children with obtunded mental status

    that IV fluids or NG ORS be given for a period of 4 to 6 hours or until an adequate degree of rehydration is achieved. It is appropriate to involve the family in the decision regarding the method of fluid replacement (Cohen et al., 1995 [A]; Mackenzie & Barnes, 1991 [A]; Santosham et al., 1982 [A]; Nager & Wang, 2002 [B]; Vesikari, Isolauri, & Baer, 1987 [B]; Listernick, Zieserl, & Davis, 1986 [B]; Tamer et al., 1985 [C]; King et al., 2003 [S,E]).

Oral Feeding Following Rehydration

9. It is recommended that refeeding of the usual diet be started at the earliest opportunity after an adequate degree of rehydration is achieved (Cohen et al., 1995 [A]; Fayad et al., 1993 A]; Santosham et al., 1982 [A]; Fox et al., 1990 [B]; Hjelt et al., 1989 [B]; Gazala et al., 1988 [B]; Walker-Smith et al., 1997 [S,E]).

Note 1: Following rehydration therapy in the child with mild to moderate dehydration, regular diets may be supplemented with oral rehydration solutions containing at least 45 mEq Na^+/L, and targeted to deliver 10mL/kg for each stool or emesis (Cohen et al., 1995 [A]) (see Appendix 4 in the original guideline document).

Note 2: It is advisable to reassess hydration status by phone or in the office when a child refuses ORS. Refusal may indicate an absence of salt craving, and, as such, the absence or resolution of dehydration (Local expert Consensus, 2005 [E]).

On-going IV or NG Fluids following Rehydration

10. It is recommended that maintenance IV fluids or NG ORS be given:
    - when unable to replace the estimated fluid deficit and keep up with the on-going losses using oral feedings alone, and/or
    - to severely dehydrated children with obtunded mental status, and after discussion with family regarding choice of IV or NG (Cohen et al., 1995 [A]; Mackenzie & Barnes, 1991 [A]; Santosham et al., 1982 [A]; Nager & Wang, 2002 [B]; Vesikari, Isolauri, & Baer, 1987 [B]; Listernick, Zieserl, & Davis, 1986 [B]; Tamer et al., 1985 [C]).

Other Therapy

11. It is recommended that anti-diarrheal agents or antiemetics not be used in the routine management of children with AGE (King et al., 2003 [S,E]).

    Note: Ondansetron may decrease vomiting and hospitalization rates in those patients who require IV or NG fluids (Reeves, Shannon, & Fleisher, 2002 [A]; Ramsook et al., 2002 [B]).

12. It is recommended that antimicrobial therapies be used only for selected children with AGE who present with special risks or evidence of a serious bacterial infection (SBI) (Barbara et al., 2000 [C]) (see Appendix 5 in the original guideline document).

    Note: Giardia lamblia and Cryptosporidium are common causes of persistent diarrhea and, if found, treatment is available with metronidazole or nitazoxanide (American Academy of Pediatrics, 2003 [O]).

13. It is recommended that probiotics be considered as adjunctive therapy, as they have been shown to reduce the duration of diarrhea (Allen et al., 2004 [M]). Family preference may be central to the decision to use probiotics. Parameters influencing the family's decision may include cost, degree of potential benefit, availability, and unverified effectiveness of commercial products.

    Note 1: A Cochrane meta-analysis of 23 randomized controlled trials found mild therapeutic benefit from probiotics that was generally reproducible regardless of organism, quality of study design, or outcome measure (Allen et

al., 2004 [M]). The following organisms/combinations showed benefit in one or more study (in alphabetical order):

- Enterococcus LAB strain SF68
- Lactobacillus acidophilus and Lactobacillus bifidus
- Lactobacillus acidophilus LB strain (killed)
- Lactobacillus casei strain GG
- Lactobacillus reuteri

Note 2: Probiotics may be more effective for rotavirus diarrhea, compared to all-cause diarrhea (Allen et al., 2004 [M]).

Note 3: The microorganisms used to culture yogurt, Streptococcus thermophilus and Lactobacillus bulgaricus, are not considered probiotics because they do not survive the acidity of the stomach to colonize the intestines. One study of malnourished infants found that yogurt, compared to milk, was not effective in reducing the duration of diarrhea (Allen et al., 2004 [M]; Bhatnagar et al., 1998 [B]).

Inpatient Management Considerations

14. It is recommended that those patients who are treated in the hospital setting and who are eligible for the AGE guideline be placed as Short Stay patients with a discharge goal of 23 hours or less (Browne & Penna, 1996 [C]; McConnochie et al., 1999 [D]).
15. It is recommended that for children receiving care in a hospital setting, prompt discharge be considered when the following levels of recovery are reached:
    - Sufficient rehydration achieved as indicated by weight gain and/or clinical status
    - IV or NG fluids not required
    - Oral intake equals or exceeds losses
    - Adequate family teaching has occurred
    - Medical follow up is available via telephone or office visit

    (Local Expert Consensus, 2005 [E]).

Education

16. It is recommended that return to school/daycare be discussed in the context of the following parameters:
    - Consideration for controlling disease transmission
        - No vomiting for 24 hours
        - Stools are able to be adequately contained
        - Assurance that daycare/school adheres to appropriate handwashing policies
    - Temperature less than 38.0 degrees C (100.4 degrees F)

    (Local Expert Consensus, 2005 [E]).

17. It is recommended that risk factors and preventive activities be discussed with parents, including:
    - Continue breastfeeding (Wan et al., 1999 [A]; Khin et al., 1985 [C])
    - Handwashing

Definitions:

Evidence Grading Scale:

A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
E: Expert opinion or consensus
F: Basic laboratory research
S: Review article
M: Meta-analysis
Q: Decision analysis
L: Legal requirement
O: Other evidence
X: No evidence

CLINICAL ALGORITHM(S)

Algorithms are provided in the original guideline document for:

- The evaluation and management for acute gastroenteritis in children aged 2 months through 5 years
- A decision tool for helping decide when to obtain stool cultures and when a child may benefit from antimicrobial therapies

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is classified for the recommendations (see "Major Recommendations").

Evidence Grading Scale:

A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
E: Expert opinion or consensus
F: Basic laboratory research

S: Review article
M: Meta-analysis
Q: Decision analysis
L: Legal requirement
O: Other evidence
X: No evidence

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Prevention or limitation of the severity of dehydration
- Prevention of the need for intravenous or nasogastric therapies
- Decreased hospitalization rate
- Shortened duration of illness and length of hospitalization

POTENTIAL HARMS

Not stated

CONTRAINDICATIONS

CONTRAINDICATIONS

Antibiotics are contraindicated for the treatment of enterohemorrhagic Escherichia coli (O157:H7) as they increase the likelihood of hemolytic uremic syndrome.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These recommendations result from review of literature and practices current at the time of their formulations. This protocol does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. The guideline document is not intended to impose standards of care preventing selective variances from the guidelines to meet the specific and unique requirements of individual patients. Adherence to this pathway is voluntary. The physician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Appropriate companion documents have been developed to assist in the effective dissemination and implementation of the guideline.

IMPLEMENTATION TOOLS

Chart Documentation/Checklists/Forms
Clinical Algorithm
Foreign Language Translations
Patient Resources
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence-based clinical care guideline for acute gastroenteritis (AGE) in children aged 2 months through 5 years. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2006 May. 15 p. [50 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1999 (revised 2005 Oct 31; reviewed 2006 May)

GUIDELINE DEVELOPER(S)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

SOURCE(S) OF FUNDING

Cincinnati Children's Hospital Medical Center

GUIDELINE COMMITTEE

Acute Gastroenteritis Team

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Acute Gastroenteritis Team 2005

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

The guideline was developed without external funding. All Team Members and Clinical Effectiveness support staff listed have declared whether they have any conflict of interest and none were identified.

GUIDELINE STATUS

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The guideline was reviewed for currency in May 2006, using updated literature searches and was determined to be current.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Cincinnati Children's Hospital Medical Center Web site.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@cchmc.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Acute gastroenteritis (AGE). Guideline highlights. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2005 Nov. 1 p. Electronic copies: Available in Portable Document Format (PDF) from the Cincinnati Children's Hospital Medical Center Web site.

Additional implementation tools, including a history taking tool and a model form for phone triage can be found in the original guideline document.

PATIENT RESOURCES

The following Health Topics are available:

- Gastroenteritis. Cincinnati Children's Hospital Medical Center, 2006 Mar. Electronic copies: Available from the Cincinnati Children's Hospital Medical Center Web site.
- Acute diarrhea. Cincinnati Children's Hospital Medical Center, 2004 Dec. Electronic copies: Available from the Cincinnati Children's Hospital Medical Center Web site.

NGC STATUS

This summary was completed by ECRI on September 1, 1998. The information was verified by the guideline developer on December 1, 1998. This summary was updated by ECRI on March 18, 2002, and reviewed by the guideline developer as of May 7, 2002. This summary was updated by ECRI on December 19, 2005. The updated information was verified by the guideline developer on January 9, 2006.

This summary was updated by ECRI on July 14, 2006. The updated information was verified by the guideline developer on July 21, 2006.

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